Amendment and Response
Applicant: Raymond H. Kraft
Serial No.: 10/800,420
Filed: March 12, 2004
Docket No.: A126.253.102
Title: SYSTEM AND METHOD OF NON-LINEAR GRID FITTING AND COORDINATE SYSTEM MAPPING

REMARKS

This is responsive to the Non-Final Office Action mailed April 14, 2009, in which a Restriction Requirement was set forth relative to the Examiner-identified inventions of Group I (claims 1-7 and 16-21) and Group II (claims 22-28). In an Election filed January 23, 2009, Applicant elected Group I (claims 1-7 and 16-21). Additionally, the Office Action rejected claims 1, 3, and 4 under 35 U.S.C. §101 as not falling within one of the four statutory categories of invention. Claims 1, 5, 16, and 20 were rejected under 35 U.S.C. §102(b) as being anticipated by Brandle et al., "Automatic Grid Fitting for Genetic Spot Array Images Containing Guide Spots" ("Brandle"). Claims 2, 3, 17, 18, and 21 were rejected under 35 U.S.C. §103(a) as being unpatentable over Brandle in view of Segman, U.S. Patent No. 6,178,272 ("Segman"). Claims 4 and 19 were rejected under 35 U.S.C. §103(a) as being unpatentable over Brandle in view of Kwon et al., U.S. Patent No. 5,091,972 ("Kwon"). Claims 6 and 7 were rejected under 35 U.S.C. §103(a) as being unpatentable over Brandle in view of Correa et al., U.S. Patent No. 6,340,114 ("Correa").

With this Response, claim 1 has been amended. Claims 1-7 and 16-28 remain pending in the application and are presented for reconsideration and allowance.

Restriction Requirement

With regard to the election of Group I, Applicant notes that U.S. Patent classifications 382/294 and 382/295 are indented under the same classification, namely classification 382/293. Classification 382/293 includes a note that reads:

> *Excluded from this subclass is any system which requires some special marking, grid, fiducial or coded indicia to register the image of a document or other object relative to the image sensor. For such excluded subject matter, see this class, subclass 287.*

Based on this note, it appears that claims in both Groups I and II should be classified within classification 382/287, such that restriction between the groups would be improper. Moreover, it appears that claims in Groups I and II are specifically excluded from classifications

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382/293-295. To the extent the Examiner views claims 1-7 and 16-28 as not being specifically excluded from classifications 382/293-295, it is respectfully submitted that claims 1-7 and 16-28 would read on both classification 382/294 (registering or aligning multiple images to one another), by reciting fitting a fiducial grid model to data acquired by an imaging apparatus, and classification 382/295 (to position or translate an image), by reciting establishing a conversion from acquired coordinates to ideal fiducial coordinates. In any event, similar subject matter recited in independent claims 1, 16, 22 and 25 is believed to be allowable as discussed below.

35 U.S.C. §101 Rejections

Independent claim 1 has been amended to recite, "based on at least one calculated absolute location of the identified acquired image feature centers, selectively modifying a structure represented by the identified acquired image feature center". As recited, claim 1 clearly provides a "tie" to another statutory category as well as a "transformation" of underlying subject matter by modifying a structure represented by identified acquired image feature centers. For example, the structure could relate to a device used in a probe card test process or structures in other imaging applications. As a result, it is respectfully submitted that claims 1, 3 and 4 meet the requirements of 35 U.S.C. §101 and thus withdrawal of this rejection is requested.

35 U.S.C. §§102 & 103 Rejections

Independent claims 1, 16, 22 and 25 all relate to calculating an absolute location of image feature centers in fiducial plate coordinates. Applicants respectfully traverse the rejections under Brandle and submit that Brandle simply does not disclose calculating an absolute location in fiducial plate coordinates as claimed. In genetic spot analysis, as taught by Brandle, one is concerned with the presence or absence of a spot and, in particular, an amount of hybridization that occurs at predetermined locations on a medium (e.g., filter, slide, microchip). See Brandle, Chapter 1, p. 357. A robot arm carrying a matrix of needles apply spots of gene product to the medium. In order to account for differences (i.e., a rotational angle) between an image of the medium and the predetermined locations of the matrix as positioned by the robotic arm, Brandle

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utilizes guide spots, which are spots placed on the medium at specified locations that consistently provide a high amount of hybridization. See Brandle, Chapter 1, p. 359. A grid fitting algorithm is used to identify guide spots and align the guide spots with where the guide spots should be given the matrix of needles. Thus, the "location" discussed in Chapter 3, page 361 of Brandle is merely a one-to-one relationship between where a guide spot is detected in the image and a predetermined position where the guide spot should be relative to the medium and is not an absolute location in fiducial coordinates. There is also no need to calculate an absolute location as the guide spot location is predetermined. Thus, Brandle simply does not disclose the features recited in the independent claims. For these reasons, independent claims 1, 16, 22 and 25 are believed to be allowable.

Segman is another image scaling reference in which a pixel array having known locations is converted into a second pixel array having known locations and whereby the conversion is specified a priori. In other words, based on a first aspect ration and a second aspect ratio, one can develop an algorithm to convert images between the two aspect ratios. This is in direct contravention of the claims of the present case, in which an image contains fiducials having a known location and objects that may randomly appear within the field of view. The point of claims in the present case is not to create a high fidelity reproduction of the image of fiducials and objects in various sizes and/or resolutions, but rather to identify a real-world manner the position of the objects in the image relative to the fiducials. Segman does not provide a means for "calculating an absolute location of identified acquired image feature centers relative to the fiducial plate in fiducial plate coordinates" and cannot reasonably be read to suggest the same.

Kwon teaches an iterative filtering process for reducing image noise and does not teach "calculating an absolute location of identified acquired image feature centers relative to the fiducial plate in fiducial plate coordinates". That Kwon might use a linear least squares method is inapposite as Kwon does not teach those elements that are lacking in Brandle et al.

Correa et al. teaches a system for automatically reading address bar codes on envelopes and the like. Correa et al. do not teach "calculating an absolute location of identified acquired image feature centers relative to the fiducial plate in fiducial plate coordinates". While Correa et

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al. may describe the use of cameras of the CCD and CMOS type, they do not teach all of the elements of the claims.

CONCLUSION

In view of the above, Applicant respectfully submits that pending claims 1-7 and 16-28 are in form for allowance and are not taught or suggested by the cited references. Therefore, reconsideration and withdrawal of the rejections and allowance of claims 1-7 and 16-28 is respectfully requested.

Any inquiry regarding this Amendment and Response should be directed to Todd R. Fronek at Telephone No. (612) 767-2522, Facsimile No. (612) 573-2005. In addition, all correspondence should continue to be directed to the following address:

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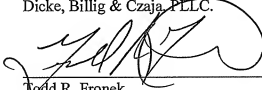
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